
FOODS AND DRUGS

LABORATORY

OF THE

DEPARTMENT OF TRADE AND COMMERCE

OTTAWA, CANADA

BULLETIN No. 416

COFFEE AND SUBSTITUTES

NOTES AND COMMENTS.

Under this heading, as occasion arises, the Bulletins issued by this Department will contain, as an appendix, such comment as may seem necessary or advisable upon matters relating to the work of the Department in connection with the administration of the Adulteration Act, the Fertilizers Act, the Feeding Stuffs Act or the Proprietary Medicines Act.

It frequently happens that correspondents ask information regarding the above Acts, of such nature that the matter in question possesses general interest, and comment upon it would prove acceptable and useful to others than the immediate questioner. In such cases the reply may find a place in these columns. For convenience of reference these notes are numbered in series.

A. MCGILL,
Chief Analyst.

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COFFEE AND SUBSTITUTES

OTTAWA, December 14, 1918.

F. C. T. O'HARA, Esq.,

Deputy Minister of Trade and Commerce,

SIR,—I beg to hand you herewith a report upon Coffee and Substitutes for Coffee, as found on the Canadian market during the past year. This inspection was ordered in April last, but unusual pressure of other work in these Laboratories has made it impossible for me to report earlier.

The work of analysis was placed in charge of Mr. Westman in June, and has been continued, at intervals, with the assistance of other members of our staff, as their services were available. Mr. Westman resigned from our staff on the 30th of September.

Samples herein reported are as follows:—

Samples worked at Ottawa.....	92
" Halifax.....	56
" Winnipeg.....	37
" Vancouver.....	8
Total.....	187 Samples.
Samples sold as Coffee.....	105
" Compounds.....	23
" Substitutes.....	25
" Extracts or Essences.....	20
" Prepared or Condensed.....	14
Total.....	187 Samples.

Five samples sold as Coffee are found to be adulterated under this Act, for the reasons given below:—

No. of Sample.	Vendor.	Manufacturer.	Nature of Adulteration.
8126	Drouin frères, Quebec....	Auguste Comte et cie, Montreal.	Consists essentially of roasted peas and chicory.
8127	Drouin frères, Quebec....	Auguste Comte et Cie, Montreal.	Consists essentially of roasted peas and chicory.
81862	John Cassie, Prince Albert.	Contains 50% chicory.
80614	P. Bisson, Ottawa	Snowden Forbes & Co., Montreal.	Contains 71% roasted grains.
84512	W. Imbleau, Montreal...	Not stated.....	Contains 87% roasted peas.

Consequent upon notification sent to the above named parties, the following explanations have been received:—

8126 and 8127.—The vendors state that the samples named had been in stock for some time, and they could not remember whether purchased as pure or as compound. They claim not to have sold under a guarantee of purity. In a certain sense this may be correct; but the selling it as *Coffee*, without modification must be held as claiming it to be *Coffee*, and nothing else. *Coffee*, like tea, sugar, butter, etc., when sold under these names must be regarded as meaning pure *Coffee*, tea, sugar, butter, etc. Otherwise the Act has no meaning, and does not protect the purchaser.

Four samples sold as Compounds, contain no *Coffee* or only very small amount and should have been sold only as substitutes for *Coffee*. These are:—

No. of Sample.	Vendor.	Manufacturer.	Nature of Admixture.
80642	A. J. Miller, Renfrew...	L. & H. Coffee and Cereal Co., Pembroke.	Contains 90% roasted cereal.
84566	H. Pariseau, Brownburgh, Que.	Not stated.....	Contains 95% chicory and peas.
79450	O. Schacter, North Bay..	Imperial Coffee Co.....	Contains 77% chicory and grain.
79455	Rava & Pianetti, Cobalt.	Phoenix Mfg. Co., Toronto..	Contains 95% chicory and roasted cereals.

Section 24 (1) of the Act defines Compounds or mixtures without regard to the percentage composition of these articles; and rules that, "No food or drug shall be deemed to be adulterated, when articles of food, not injurious to health are mixed together as a Compound, and sold or offered for sale as such, with each package, roll, parcel or vessel containing such articles distinctly labelled as a mixture, in conspicuous characters forming an inseparable part of the general label, bearing the name and address of the manufacturer."

It is highly desirable that such mixtures should be named in a way which would inform the buyer truthfully regarding their composition; and if the name of any single ingredient appears upon the label, such ingredient should be present to at least fifty per cent of the weight of the whole. Thus an article sold as a Compound *Coffee* or *Coffee Mixture*, should contain at least 50 per cent of actual *Coffee*. The four samples above referred to contain less than 25 per cent of *Coffee*, and two samples, less than 10 per cent.

I regret that owing to the non-existence of a ruling to this effect, I am unable to declare the above samples adulterated under this Act. They are really substitutes for Coffee, and should be sold as such.

RESULTS OF COFFEE INSPECTION IN CANADA SINCE 1888.

Year.	No. of Bulletin.	Total Samples Examined.	Adulterated.	Genuine.	Percentage of Genuine Samples.
1888.....	3	85	41	44	52
1892.....	29	140	55	54	38
1892.....	31	141	36	102	72
1904.....	100	75	19	45	60
1904.....	172	449	45	391	87
1909.....	207	397	26	260	66
1910.....	216	397			85
1914.....	290	339			83
1916.....	340	407			93
1918.....	416	187			

Owing to the fact that the last three reports include a considerable number of samples sold not as Coffee, but as Coffee Compounds or as 'Substitutes for Coffee, the results given are not directly comparable; but a very marked improvement in the character of the articles offered as Coffee on the Canadian market since 1888 is manifest.

Substitutes for Coffee, and preparations of Coffee variously known as Coffee extracts; Condensed Coffee, etc., are more in evidence within recent years. To many of these preparations no exception can be taken on the ground of wholesomeness or desirability, although usually they are offered at prices which justify their being classed as luxuries rather than as staples.

NOTES ON METHODS OF ANALYSIS.

When chicory only is present in admixture with Coffee it has been shown that a close approximation (well within 5 per cent) of the percentage amount present can be determined from the density of an extract made under fixed conditions. (McGill Trans. Roy. Soc. Canada. Sec. 111, 1897.) Chicory is a more or less variable substance and its extractive matters are naturally more or less affected by the drying and roasting treatment which it receives. Dyer (Analyst, 1898, 103) quotes eight samples of roasted chicory in which the soluble material varies from 77.2 per cent to 78.5 per cent and this may be taken to represent ordinary roasted chicory as prepared for admixture with Coffee. He shows, however, that by over-roasting, the soluble matters may be reduced to less than 60 per cent, thus more closely approaching the extractive matter of Coffee which averages about 22 per cent.

McCrae and Kloot (The Analyst, November, 1918) state that so-called "Witgatboom" is in the English market, as a substitute for chicory, and is sold as such. This term includes the roots of *Boscia transvaalensis* and *redmanni*, *Merua pedunculata* and *Capparis albitrunca*, all products of South Africa. Specimens of the three genera named, when dried, and roasted in the same way as chicory, yielded extractive matter varying from 43 per cent to 60 per cent. It is evident that a considerable substitution of Witgatboom for chicory would decidedly reduce the extractive, and thus lower the density of the ten per cent decoction. The interpretative tables for Coffee and chicory mixtures published by McGill and above referred to would of course no longer apply. The microscope shows certain histological elements, particularly a triangularly pitted cell, which may serve to differentiate Witgatboom from chicory. It is

by no means certain that this article has not found its way to Canada; but this has not yet been demonstrated. Mr. A. J. Landry finds "that a sample of so-called *American chicory* appears to be similar to the chicory found in Coffee mixtures on the Eastern market." It gives results quite different from those given by ordinary chicory, and may indicate the substitution of different material. Mr. Westman suggests, as the result of work done by Mr. Dawson, that the most reliable way of estimating chicory is by hand separation under a lens. He finds that duplicates to within one per cent may thus be obtained.

As regards corroboration of the percentage of Coffee present by determination of nitrogen, Mr. Westman concludes that "results are only of value in a very general way." While determination of caffeine is also of little positive value owing to the fact that the amount of caffeine in Coffee is itself a variable.

The alkalinity and solubility of the ash may be of value especially in cases where the fineness of the grinding is such as to make difficult separation under lens.

Reducing sugars are generally an indication of the presence of chicory, and their amount is roughly proportioned to the chicory present. Roasted peas do not materially increase the sugar content.

The petroleic ether extract (fat) may vary from about 14 per cent in pure Coffee to much lower numbers where chicory or roasted cereals are present.

The phosphate and manganese contents of the ash, also refractometer reading on ten per cent extracts, were investigated but led to no specially helpful results.

I would respectfully recommend publication of this report as Bulletin No. 416.

I have the honour to be, Sir,

Your obedient servant,

A. MCGILL,

Chief Analyst.